Climate Action Team & Climate Action Initiative

Governor Schwarzenegger signed Executive Order # S-3-05 on June 1, 2005. The Executive Order established greenhouse gas targets:

- By 2010, Reduce to 2000 Emission Levels
- By 2020, Reduce to 1990 Emission Levels
- By 2050, Reduce to 80 percent Below 1990 Levels

The Secretary of CalEPA will lead a **Climate Action Team** made up of representatives from the agencies listed above to implement global warming emission reduction programs and report on the progress made toward meeting the statewide greenhouse gas targets that were established in the executive order. Per the Executive Order, the first report is due to the Governor and the Legislature in January 2006 and bi-annually thereafter.

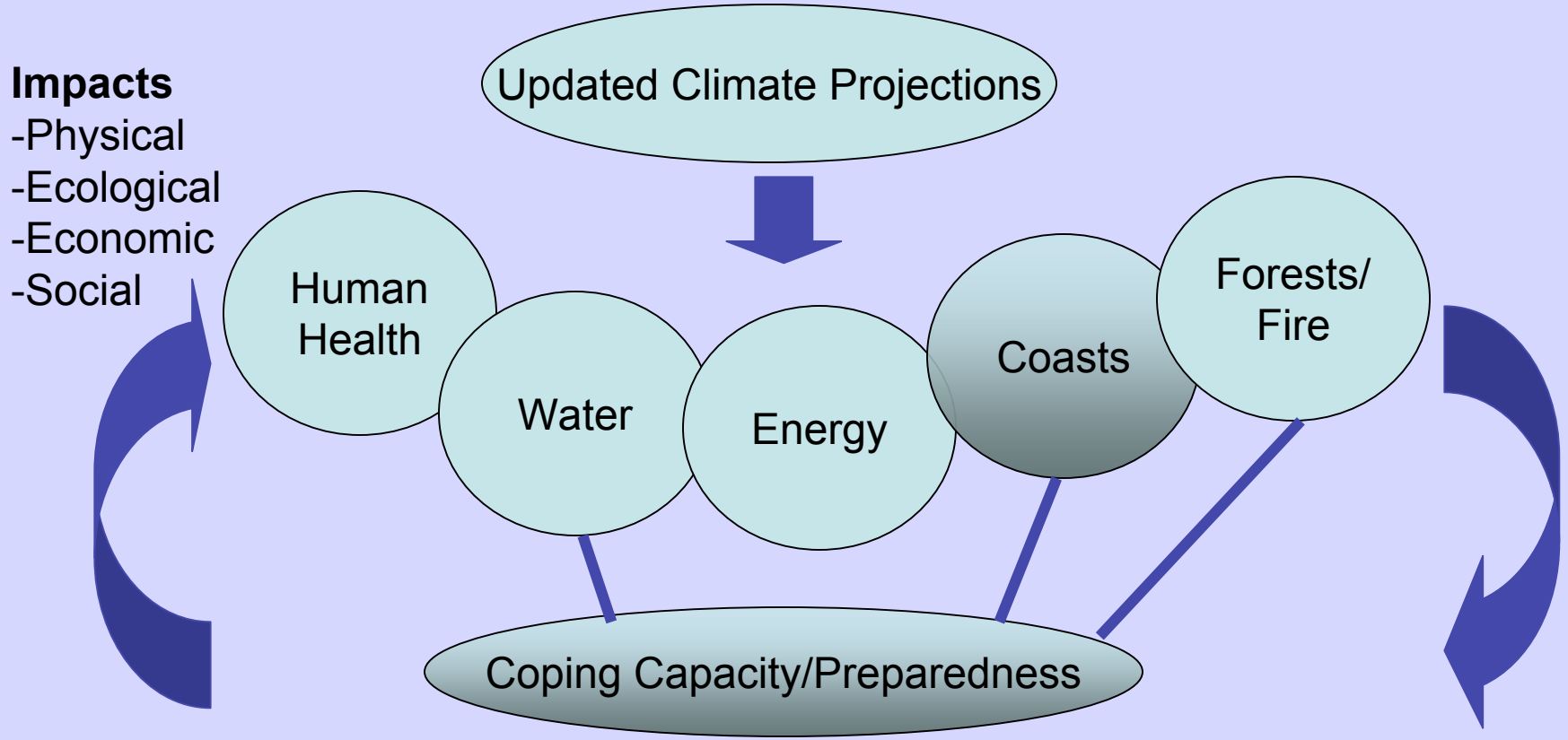
How the climate changes in the future depends on future emissions of greenhouse gases (GHGs) and other pollutants, which in turn depend upon how population, economies, energy technologies and societies develop. The Intergovernmental Panel on Climate Change Special Report on Emissions Scenarios developed a range of projections of possible future emissions. The Scenario Analysis will include anevaluation of scenarios that span nearly the full range developed by the IPCC. An initial report on the scenario analysis will be submitted to the Governor and Legislature in January 2006.

Research Team

Climate Scenarios	Scripps: Dan Cayan, Myre Tyre, Mike Dettinger; Santa Clara University: Ed Maurer
Water Resources	UC Berkeley: Michael Hanemann, John Dracup; NHI: David Purkey; UC Davis: Jay Lund; LBNL: Norman Miller, Larry Dale
Agriculture	UC Berkeley: Andrew Gutierrez, Dennis Baldocchi, M. Hanemann; UC Davis: Louise Jackson, Kate Scow; Columbia University: Wolfram Schlenker
Coastal	Scripps: Dan Cayan, Peter Bromirski; NCAR: Susanne Mozer; University of Illinois: Katharine Hayhoe; UCLA: Linwood Pendleton; UC Berkeley: M. Hanemann; UCS: Amy Luers
Forestry	Scripps: Tony Westerling; LBNL: Norman Miller, Margaret Torn; University of Illinois: Katharine Hayhoe; USDA: Ron Neilson; UC Berkeley: John Battles, Max Moritz, Keith Gilless; UCS: Amy Lynd Luers
Air Quality/Public Health	UC Davis: Michael Kleeman and staff from ARB
Overall Technical Management	California Climate Change Center: Dan Cayan, Michael Hanemann, Guido Franco

Climate Change Impacts on California
the Governor's Scenario Assessment

- Study Components



Adequacy of currently planned or taken mitigation and adaptation measures?

Susi Moser,NCAR

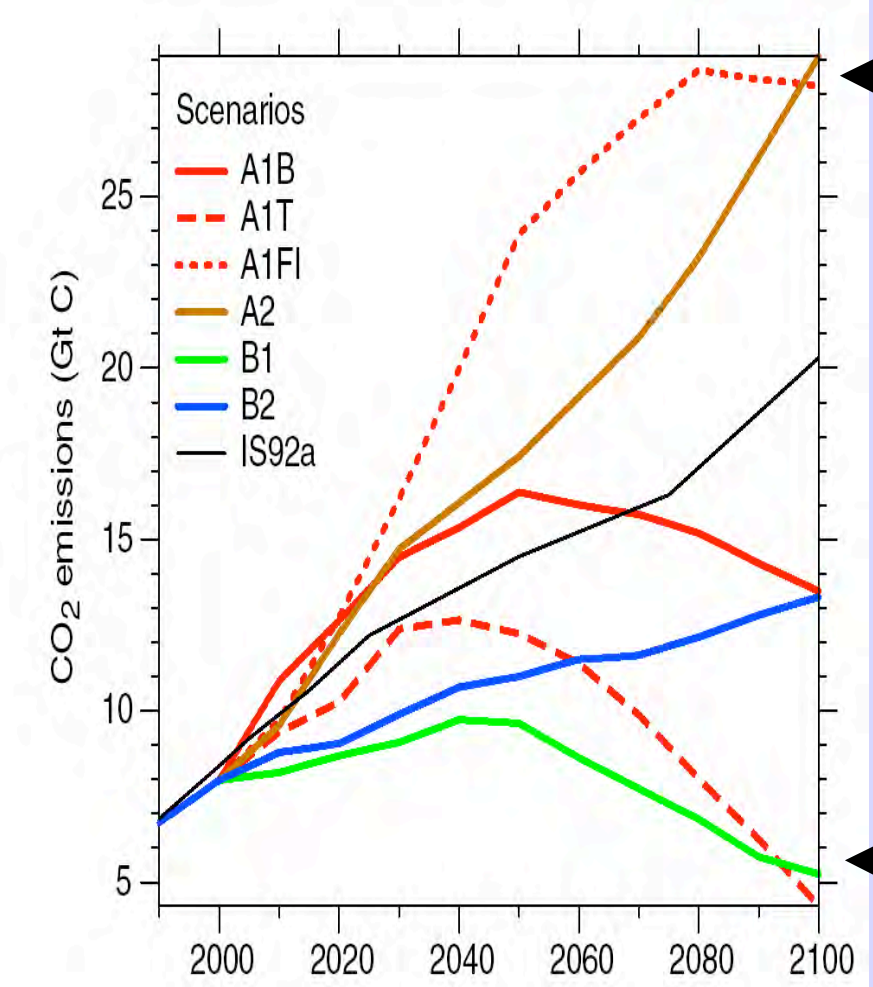
Progress on Scenarios effort:

GCMs: PCM (NCAR) GFDL CM2.1
GHG Emissions A2 (higher, carbon economy continues) B1 (lower)

Datasets extracted and available to study team
- historical period
- 2 climate change scenarios (1 run each) for both GCMs
- GCM (~200km grid)
  - super-Calif region,
  - daily, monthly
  - subset of surface and 3-d atmosphere variables
- downscaled (`12km grid) via statistical technique by Ed Maurer)
  - California and Nevada
  - monthly and daily (daily are shuffled synthesis from historical sample)
  - surface variables
- hydrological variables from VIC model by Ed Maurer
  - fluxes, soil water conditions @ 12km grid
  - streamflow, selected river inflows to key reservoirs

Global GHG Emissions Scenarios

Intergovernmental Panel on Climate Change (IPCC)

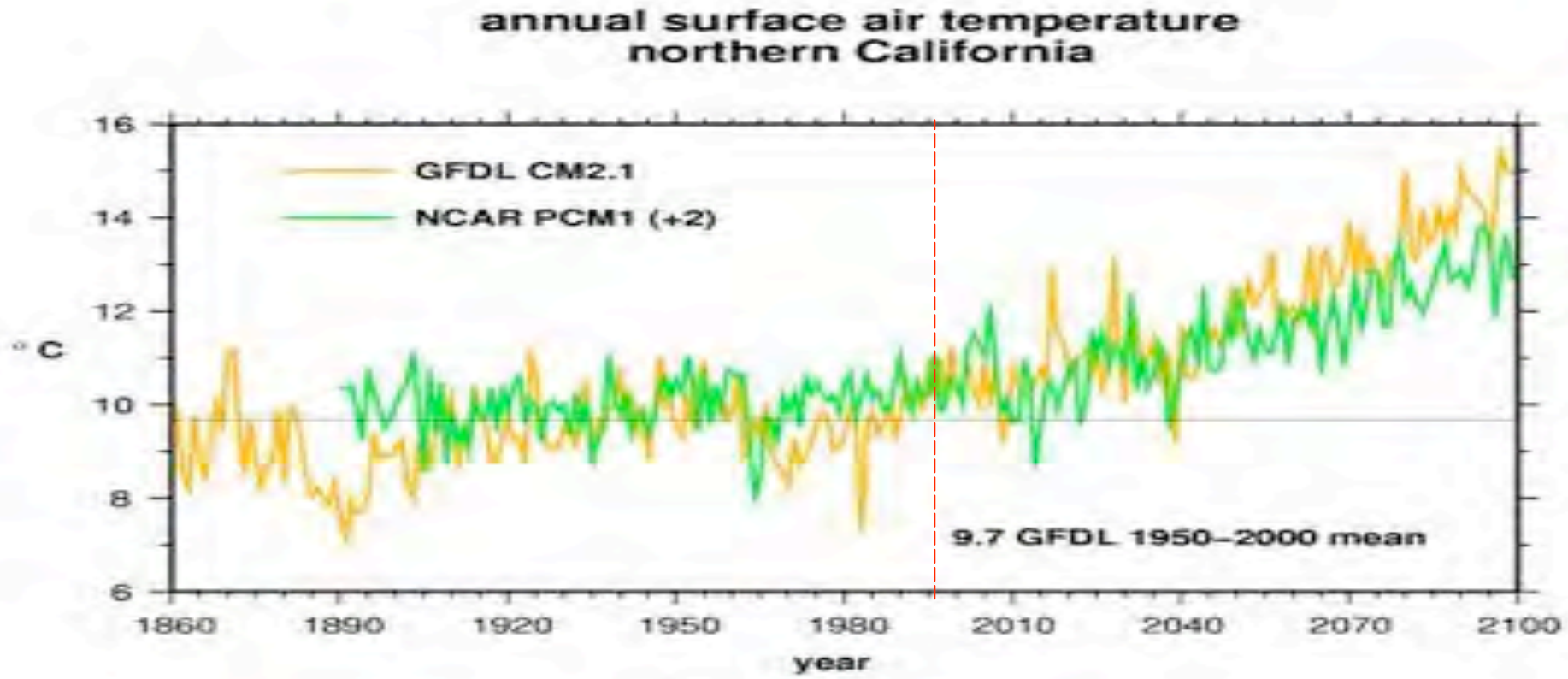


Higher (A2)

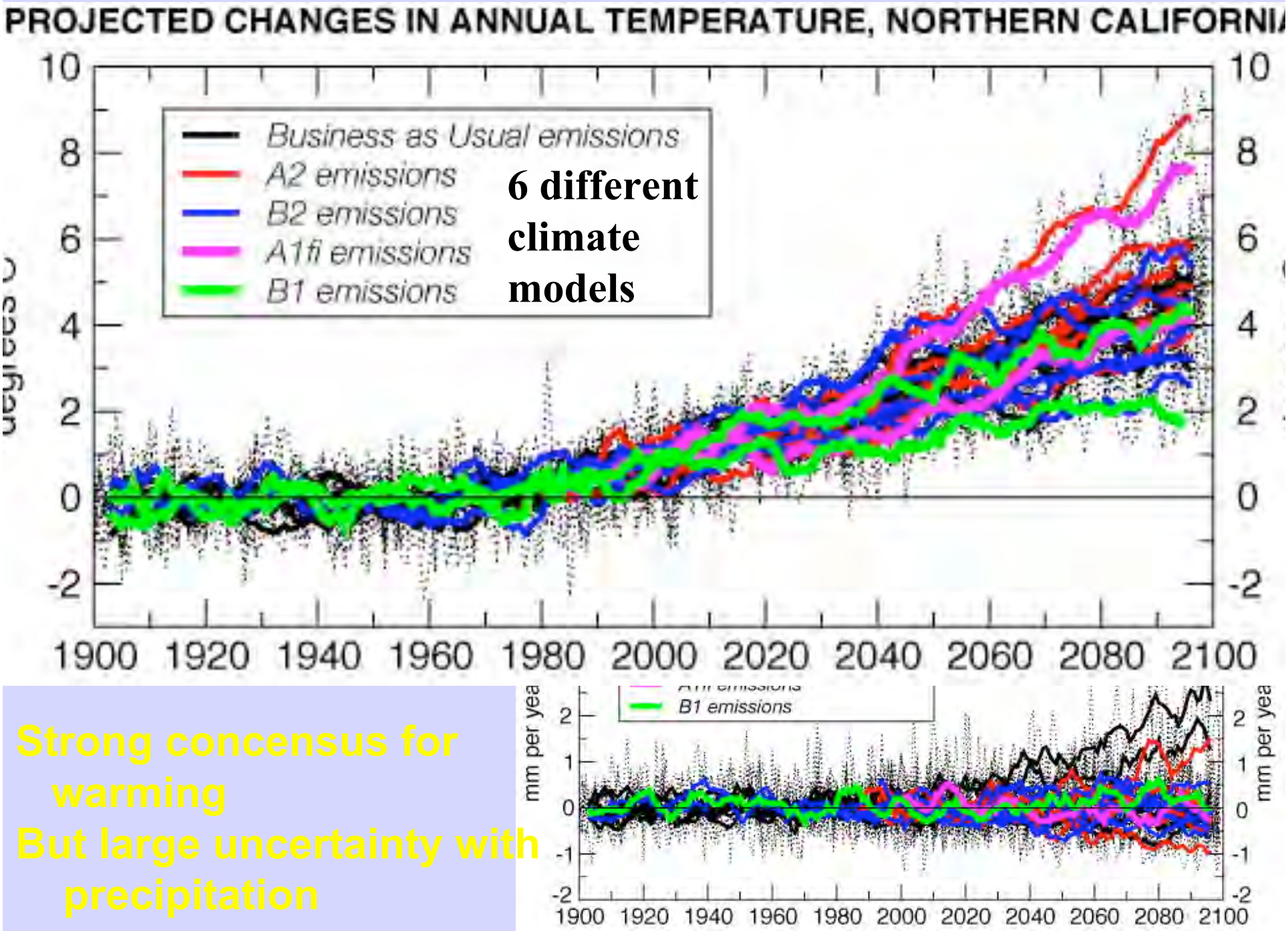
A2 scenario describes a very heterogeneous world. Ccontinuously increasing global population. Economic development regionally oriented Economic growth and technological change are fragmented.

B1 describes global population that peaks in mid-century and declines thereafter, rapid changes in economic structures toward service and information economy, with reductions in material intensity, and the introduction of clean and resource-efficient technologies.

Lower (B1)

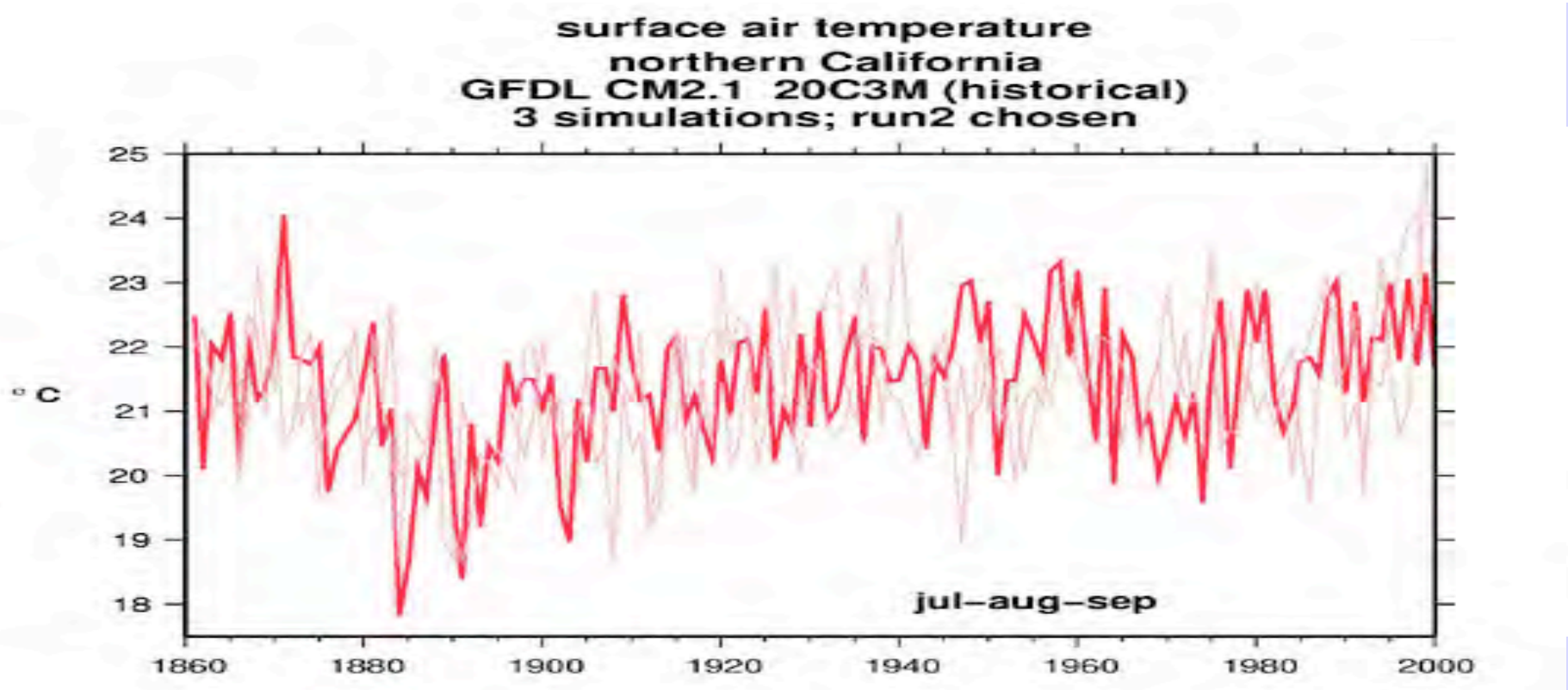


GFDL CM2.1 and PCM simulations,
A2 emissions scenario



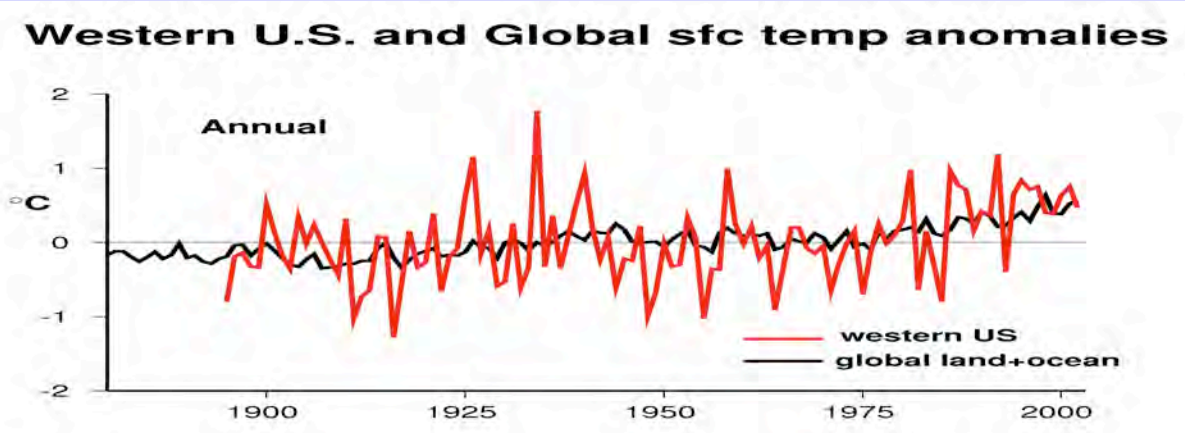
Strong concensus for warming

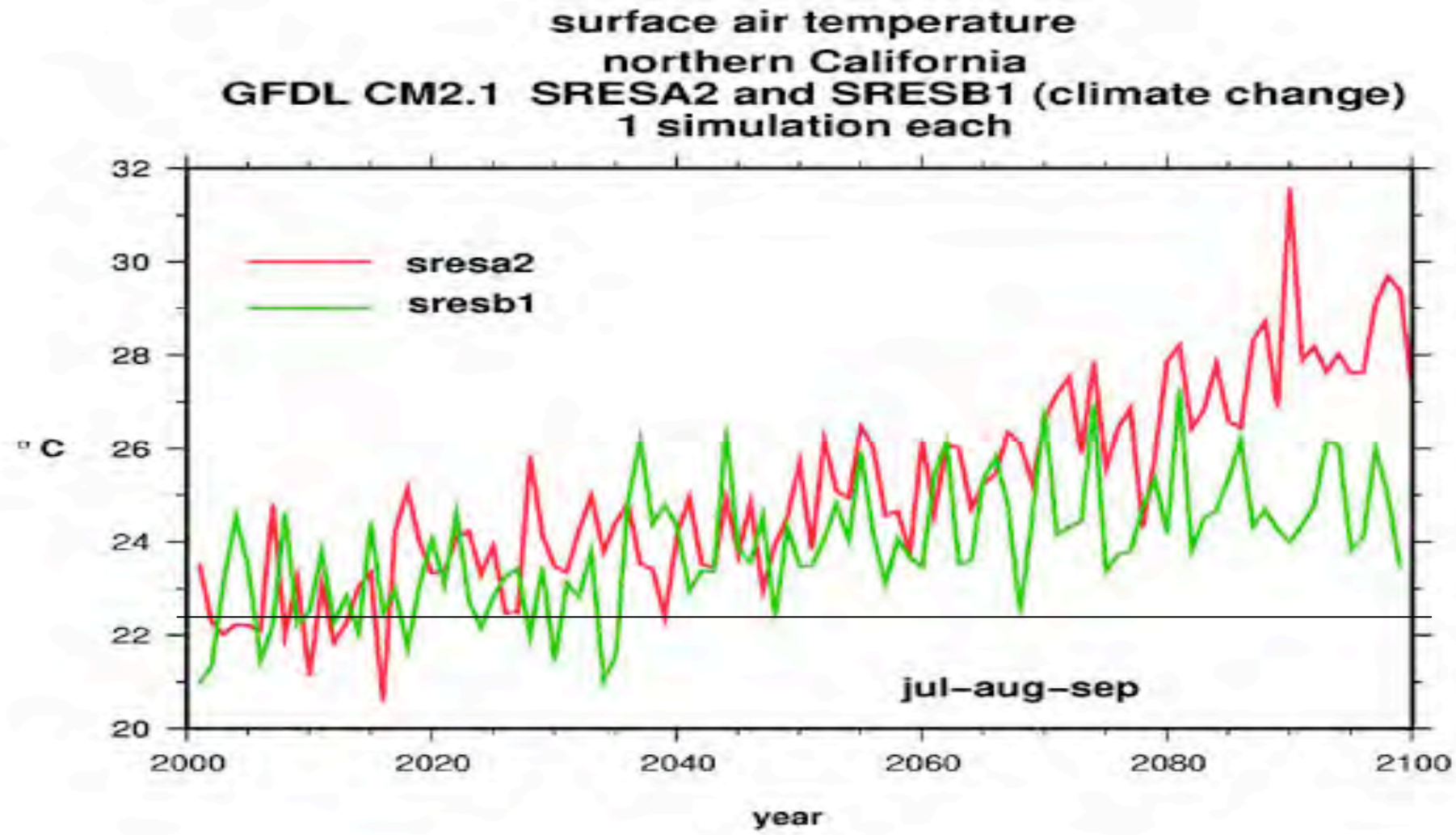
But large uncertainty with precipitation



Historical temperature from GFDL CM2.1
"Run2" (of 3 ensembles) serves as climatology

Bonfils, Santer, Duffy suggest that anthropogenic Climate change signal is now *detectable* from observed Temperature record

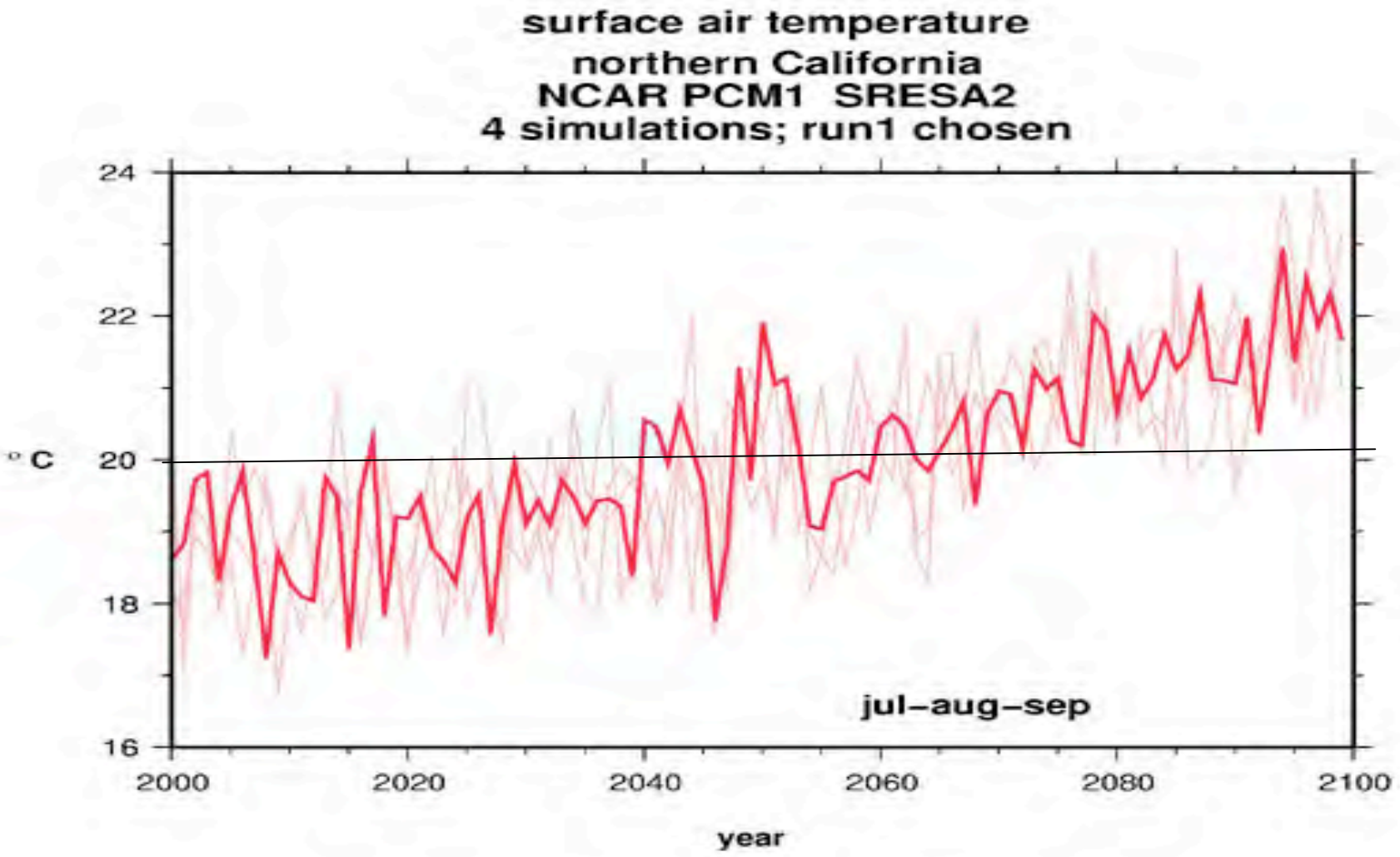




NoCal sfc Temp

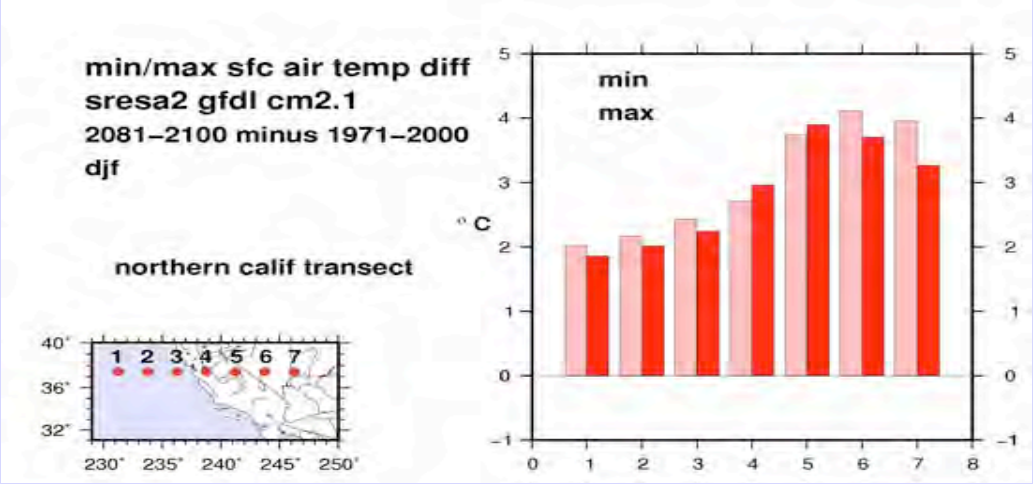
GFDL CM2.1 simulations for SRES scenarios B1 (green) and A2 (red)

Although the two scenarios are quite different, the two runs do not diverge very strongly until about 2050

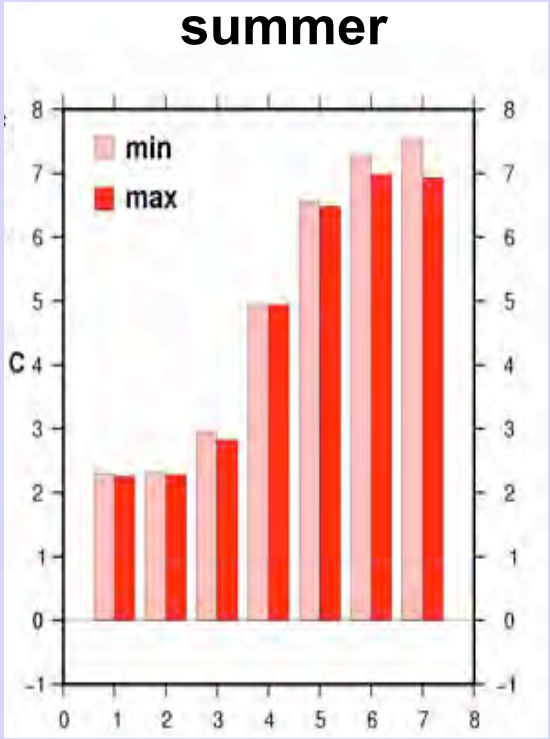


NoCal summer surface temp
PCM “Run1” and 3 other ensemble members
Ensemble illustrates inherent variability; each ensemble
member contains interannual-interdecadal fluctuations
In addition to GHG forced trend

winter

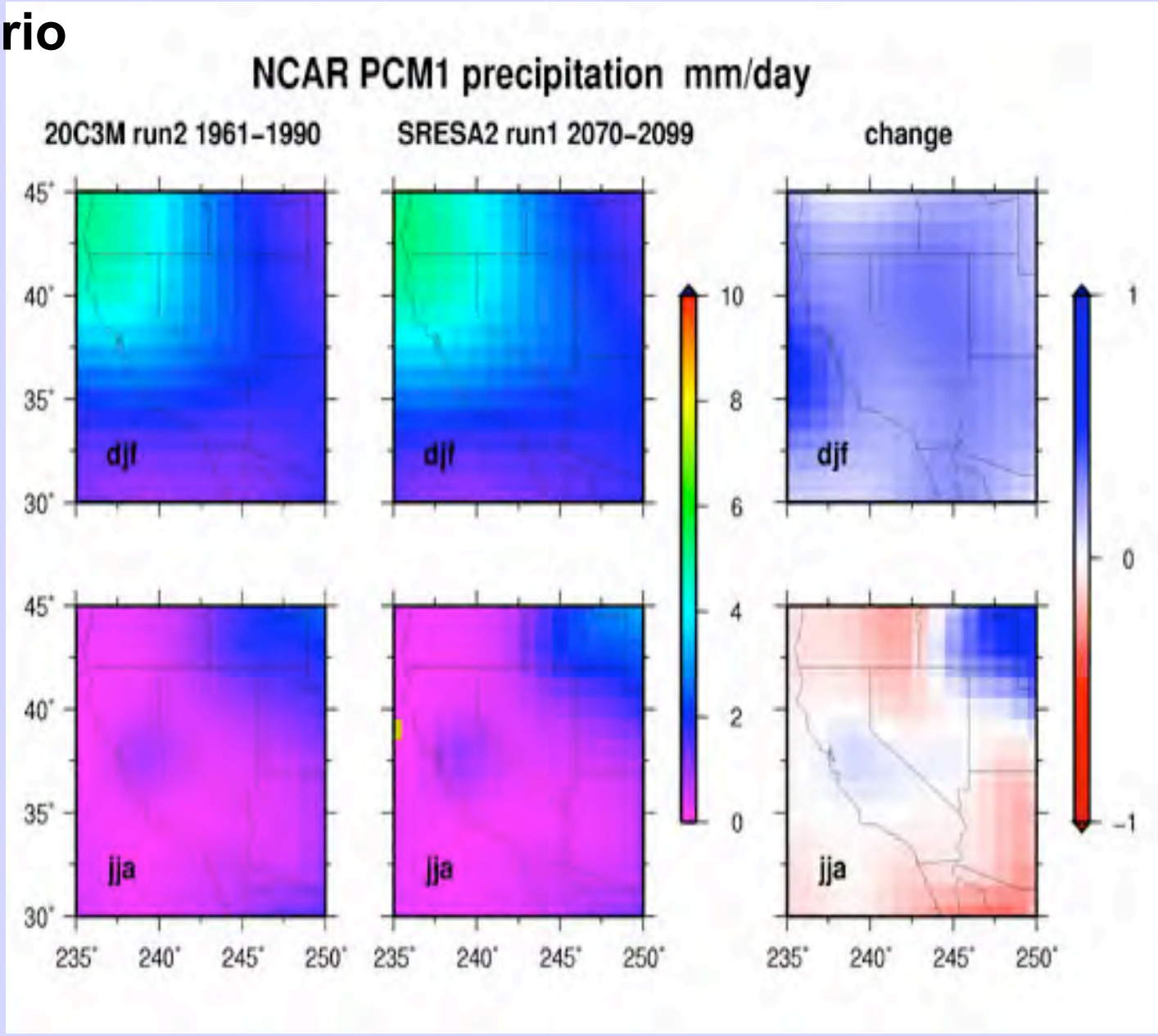


summer

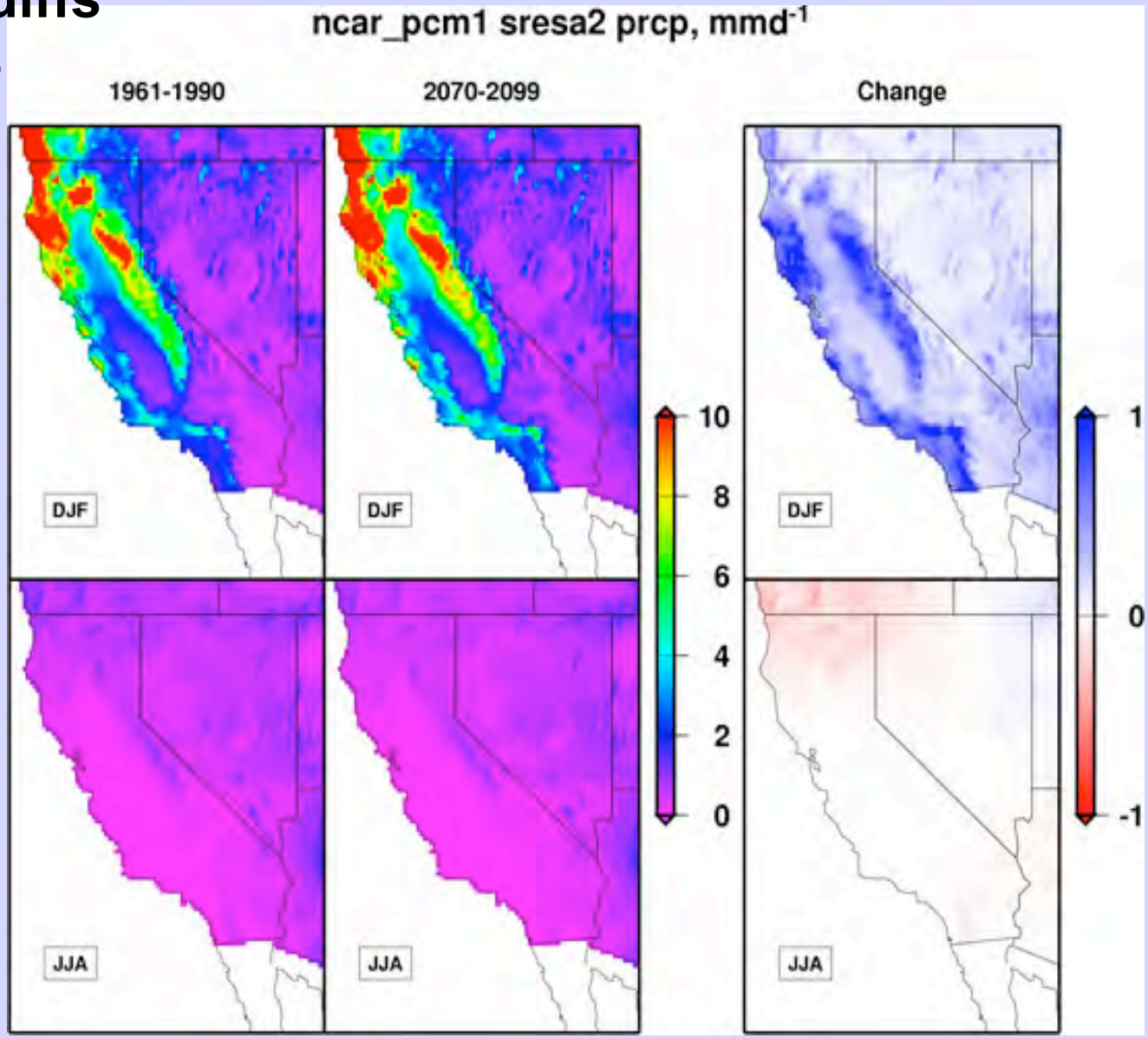


Models indicate that climate warming over continent in summer exceeds warming in winter by 2-3C

GCM precipitation
30yr means and diffs
PCM A2 scenario



Downscaled precipitation
30yr means and diffs
PCM A2 scenario



Precipitation
Is characterized more
By variability throughout
The 100y simulation
Through the 2000's
Than by trends. The
Last 30y of PCM A2
are ~15% wetter th
Historical climatology

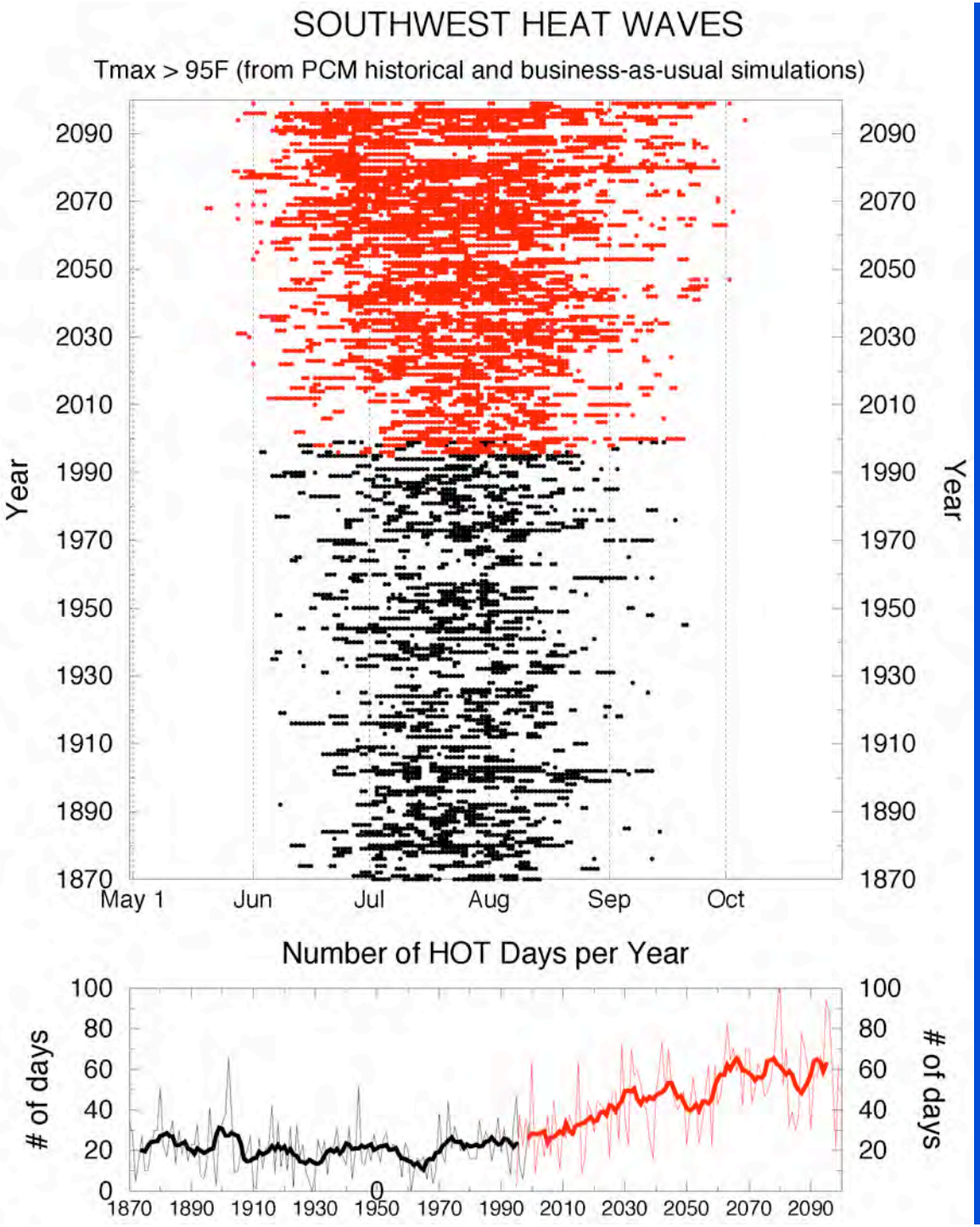
GFDL becomes a bit
drier at the end of the
2000's

Ed Maurer, Santa Clara Univ

Norm Miller et al are calculating the rising vulnerability of California cites to heat waves and will investigate impacts on electrical demand

Moderate climate changes in average conditions translate into large changes in the extremes

from ACPI Parallel-Climate model simulations,



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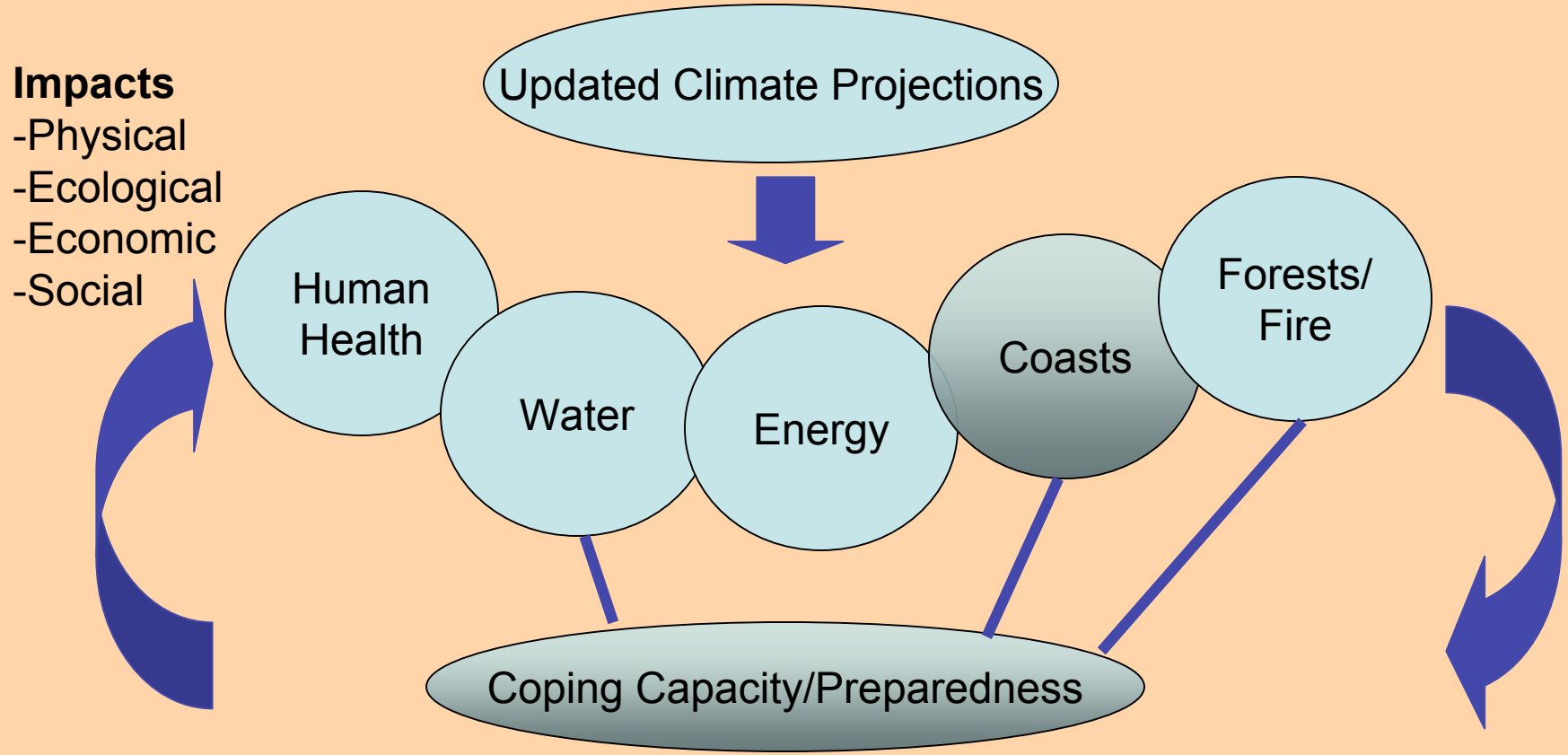

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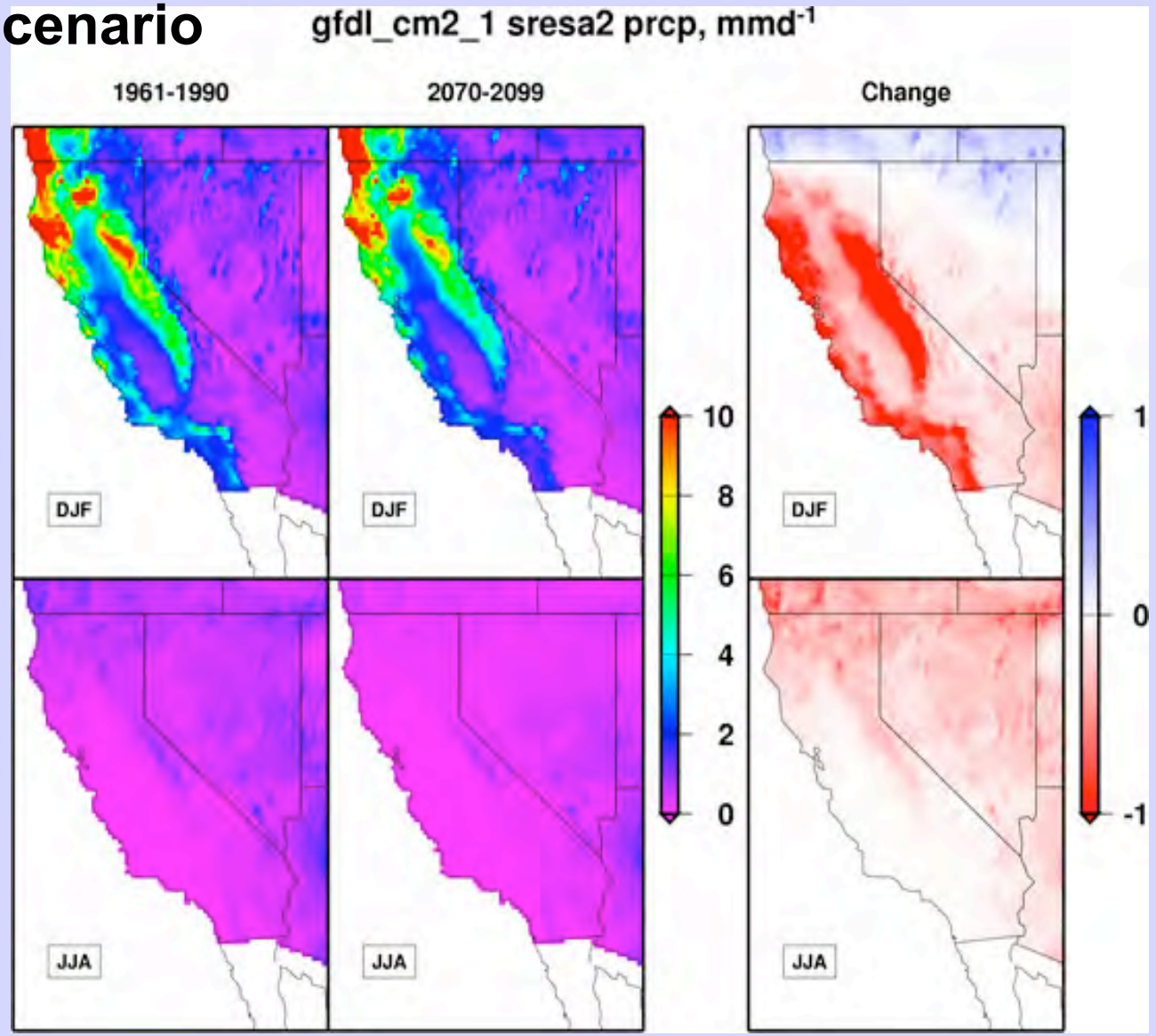
Downscaled precipitation
30yr means and diffs
GFDL CM2.1 A2 scenario



Ed Maurer, Santa Clara Univ